



August 2002

Volume III, Issue 8

## Air Force awards hydrocarbon study contracts

**EDWARDS AIR FORCE BASE, Calif.** — Two, one-year, \$2.6-million Air Force study contracts were recently awarded to Boeing's Rocketdyne Propulsion & Power unit and an Aerojet/Pratt & Whitney joint venture May 7 and July 5, respectively, to pursue hydrocarbon booster technologies under the Integrated High Payoff Rocket Propulsion Technology (IHPRPT) program.....2

## Lab develops detector, software for improved inspection

**WRIGHT-PATTERSON AIR FORCE BASE, Ohio** — Researchers from the Air Force Research Laboratory recently traveled to Hill AFB, Utah, to train depot production radiography personnel to use digital radiography systems, a technology that could improve and simplify nondestructive inspection of aircraft airframes and structures.....3

## First Step Program provides students chance to SOAR

**WRIGHT-PATTERSON AIR FORCE BASE, Ohio** — Thanks to volunteers from the Air Force Research Laboratory Air Vehicles Directorate, children in the Dayton First Step Program got an opportunity to build and fly small-scale aircraft, parachutes and hot air balloons July 17-19. ....4

**Additional information is available online including:**

- Breaking News Features
- Corporate Calendar
- Contact Information

## AFRL names 2002 Fellows honorees

*by Katherine Gleason, AFRL Public Affairs*

**WRIGHT-PATTERSON AIR FORCE BASE, Ohio** — The Air Force Research Laboratory has announced the selection of five well-renowned scientists and engineers as AFRL Fellows.

This year's honorees are:

**Dr. William Blumberg**, Space Vehicles Directorate, Hanscom AFB, Mass.;

**Dr. William Copenhaver**, Propulsion Directorate, Wright-Patterson AFB, Ohio;

**Dr. Kueichien Hill**, Sensors Directorate, Wright-Patterson AFB, Ohio;

**Dr. Paul McManamon**, Sensors Directorate, Wright-Patterson AFB, Ohio; and

**Dr. Robert Peterkin**, Directed Energy Directorate, Kirtland AFB, N.M.

"Our researchers work hard creating the future for our nation's Air and Space Force," said Maj. Gen. Paul D. Nielsen, AFRL commander. "The men and women we recognize as AFRL Fellows ensure technological superiority for our Air Force through their significant scientific achievements and personal commitment to excellence."

**Blumberg** is being recognized for augmenting the understanding of infrared background signatures and their effects on surveillance systems. He is responsible for the Battlespace Environment Division's overall technical direction in specifying, forecasting, mitigating, and exploiting environmental impacts on Air Force space systems.

**Copenhaver's** expertise is in the area of compression system aerodynamics. His

breakthroughs in jet engine stall prevention have had great impact on both military and commercial aircraft. In addition, he has led teams on a variety of missions ranging from development of innovative concepts, to full-scale compression system component demonstration tests.



**2002 AFRL FELLOWS** — (from top left to right) Dr. William Blumberg, Dr. William Copenhaver, Dr. Kueichien Hill, Dr. Paul McManamon and Dr. Robert Peterkin

# news@afrl

August 2002

## Commander

Maj. Gen. Paul D. Nielsen

## Director of Public Affairs

Anne Gunter

## Production Editor

Jill Bohn

## Associate Editor

Katherine Gleason

news@afrl is published quarterly by the Office of Public Affairs of Air Force Research Laboratory Headquarters. Contact the office at AFRL/PA, Building 15 Room 225, 1864 4th St., WPAFB, Ohio, 45433-7132, (937) 656-9010/9876, or send e-mail to AFRL.PA@afrl.af.mil. Contents of this newsletter are not necessarily the official views of, or are endorsed by, the U.S. Government, the Department of Defense or the Department of the Air Force. The editorial content is edited, prepared and provided by this office. Photographs are official U.S. Air Force photos unless otherwise indicated. Submission guidelines are available from this office or on-line. Electronic copies and additional full-text articles are available on-line at:

<http://extra.afrl.af.mil/news/index.htm>

## Air Force awards hydrocarbon study contracts

by *Ranney Adams, Propulsion Directorate*

EDWARDS AIR FORCE BASE, Calif. — Two, one-year, \$2.6-million Air Force study contracts were recently awarded to Boeing's Rocketdyne Propulsion & Power unit and an Aerojet/Pratt & Whitney joint venture May 7 and July 5, respectively, to pursue hydrocarbon booster technologies under the Integrated High Payoff Rocket Propulsion Technology (IHRPT) program.

The objective of the Hydrocarbon Boost Program is to demonstrate achievement of the IHRPT Phase II goals for space launch boosters and to assure the technology transition to future Air Force systems. The IHRPT program calls for time-phased, integrated technology demonstrations, with each phase successively more challenging.

When demonstrated, the Second Phase IHRPT hydrocarbon boost goals will provide a quantum leap over current baseline technology. A goal example might be illustrated by Air Force efforts to make substantial improvements in specific impulse (Isp), the mathematical measure of a rocket's fuel efficiency, while also requiring substantial improvements in reliability and reductions in costs.

In an effort to double the nation's rocket propulsion capabilities, Air Force Research Laboratory's Propulsion Directorate personnel have been leading the IHRPT mission since 1993, with DoD agencies, NASA and major American rocket industry actively participating in the three-phase program.

Boeing Rocketdyne and Aerojet are already supporting IHRPT in other categories, such as cryogenic propulsion, through the Integrated Powerhead Demonstration (IPD) effort. The participation of industry partners like Rocketdyne and Aerojet/Pratt & Whitney enables the program to rapidly transition technology advances and innovations.

Following completion of these one-year study contracts, there may be a follow-on contract to design and build a demonstration engine based on study results. @

## Find additional features on the web .....

**New facility operations chief takes over lab's reins**

**Airborne Laser completes maiden voyage over Kansas**

**AFRL personnel take to the field at Ft. Drum**



# IF engineer awarded national honor

by Fran Crumb, Information Directorate



**Dr. Bruce W. Suter**

ROME, N.Y. — Dr. Bruce W. Suter, founder and current director of the Center for Transmission and Exploitation at the Air Force Research Laboratory Rome Research site, wears the prestigious Arthur S. Flemming Award for Scientific Achievement. The award was presented June 11 during ceremonies at George Washington University. Established in 1948 by Washington's Downtown Jaycees, the Flemming Awards

honor outstanding federal employees with three to 15 years of government service for their extraordinary contributions to the federal government.

Recognized by the president, agency heads and the private sector, the winners are selected from all areas of the federal service. Each year there are 12 recipients; four individuals are selected in each of the three categories: administrative, scientific, and applied science categories.

Suter was selected for the award based on his exceptional professional and community service as a principal member of the technical staff at the AFRL Information Directorate. The award is administered by George Washington University, Government Executive magazine and the Arthur S. Flemming Awards Commission. Award presentations were made at a June 11 ceremony on the campus of George Washington University. @

## Lab develops detector, software to improve inspection

by Timothy R. Anderl, Materials and Manufacturing Directorate

WRIGHT-PATTERSON AIR FORCE BASE, Ohio— Researchers from the Air Force Research Laboratory recently traveled to Hill AFB, Utah, to train depot production radiography personnel to use digital radiography systems, a technology that could improve and simplify nondestructive inspection of aircraft airframes and structures.

Researchers demonstrated the use of a high-resolution digital flat-panel x-ray detector and its respective software. The transition to digital radiography technology provides people at air logistics centers with highly improved tools for evaluating complex aircraft structures. The technology also provides people with high-resolution capability, enhanced performance and reliability over conventional film-based radiography methods.

Under a contract with the AFRL Materials and Manufacturing Directorate nondestructive evaluation branch, General Electric Corporate Research and Development Center, Advanced X-ray Inc. and Varian Inc. were asked to deliver products for use in the nondestructive inspection of aircraft structures. Nondestructive inspection and evaluation of aircraft eliminates the need for unnecessary maintenance and aircraft disassembly, which has the potential for creating additional damage and problems in aging Air Force systems.

Radiography inspection is used during aircraft manufacturing, maintenance and repair to locate hidden defects such as cracking, corrosion, foreign object damage, voids and moisture in aircraft materials and structures. It is also used extensively during the manufacturing of aircraft turbine engine components to detect and evaluate cavities, micro-shrinkage, porosity, inclusions, cracking and to inspect the internal geometry of components.

Researchers from GE and the Materials and Manufacturing Directorate tested and evaluated commercially available digital radiography panels to determine whether the products met criteria required by air logistics centers.



## Honoring the past

Maj. Gen. Paul Nielsen, Air Force Research Laboratory commander, and Mr. Robert May, AFRL executive director, cut the ceremonial ribbon at the grand opening of the Heritage Hall for the AFRL Propulsion Directorate July 11. There are more than 50 items on display illustrating the directorate's rich history, technological discoveries and advancements.

**Improve continued on page 6**

# First Step Program provides students chance to SOAR

*by Air Vehicles Directorate Public Affairs*

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — Thanks to volunteers from the Air Force Research Laboratory Air Vehicles Directorate, children in the Dayton First Step Program got an opportunity to build and fly small-scale aircraft, parachutes and hot air balloons July 17-19.

The volunteers help prepare these students for a larger event with, SOAR, "Students Open to Aviation Research," an integral part of the Vectren Dayton Air Show that offers Dayton youth the opportunity to engage in career exploration and educational activities.

The Wright Site Educational Outreach office developed the program in order to educate youth in preparation for the upcoming 2003 Centennial of Flight celebration, as well as generating interest in careers in aeronautics and engineering.

The program is accomplished through collaboration among the United States Air and Trade Show, Dayton Public Schools, the City of Dayton, Miami Valley RTA, local business and industry, and community organizations.

Hank Baust, VA Project Engineer, and Maxwell Blair, VA Research Aerospace Engineer, coordinated the volunteer effort aimed at introducing children to the field of avionics.

During the first portion of the program held at Buckeye Trails summer day camp, approximately 175 children in kindergarten through eighth grade rotated through four stations, which included using hair dryers, ping-pong balls and straws to dem-



*SOAR program volunteer, Max Blair, (center) an Air Vehicle Directorate Research Aerospace Engineer, assists Charlie Hicks (left) with the basics of flying an e-charger while Christian Jordan Blair looks on.*

onstrate aerodynamic concepts, such as Bernoulli's principle, as well as witnessing an indoor hot air balloon launch.

The engineers, mentors and camp counselors then assisted older children in making and launching simple e-charger airplanes, tissue-paper hot air balloons and

garbage bag parachutes, once again demonstrating how basic equipment and designs can be used to explain aviation principles.

The final day, volunteers set up two booths at the 2002 Dayton Air Show to demonstrate the basics of aviation. @

## AFRL Showcases technologies at British airshow

*by Deborah Mercurio, Kirtland Air Force Base*

FARNBOROUGH, England — Farnborough International 2002, world-renowned exhibition and flying display organized biannually by the Society of British Aerospace Companies, is the site of various Department of Defense technologies. Some Air Force technologies highlighted are the Airborne Laser, Predator and Miniature Munitions.

This year's show hosted a "who's who" of aerospace companies exhibiting and demonstrating their products in the civil, military and private aviation fields. Technical exhibits feature the latest equipment available in the materials, avionics and ground equipment arenas.

The 2002 show is the 54th anniversary of the exhibition being held at the Farnborough Aerodrome. This year's show moved for

the second time from its traditional September slot to July 22 to 28. Official delegations and aerospace professionals from around the world walked a path among the many exhibits.

Exhibitors from more than 30 countries with over 100,000 visitors along with many countries represented by official delegations attended the show.

Farnborough is located in northeast Hampshire on the Surrey-Hampshire border, approximately 50 km southwest of London in Southern England.

The English town is known as the home of the Royal Aircraft Establishment and for hosting international airshows. Most of the research for the Concorde jet, the world's only supersonic airliner, took place in Farnborough. @



# Ruff assumes command of munitions directorate

by Rex Swenson, Munitions Directorate

EGLIN AIR FORCE BASE, Fla. — Col. Michael C. Ruff assumed command/directorship of the Eglin Air Force Research Laboratory Munitions Directorate (AFRL/MN) during an Assumption of Command ceremony August 1, at the Eglin Enlisted Club. Maj. Gen. Paul Nielsen, Commander of AFRL, officiated the ceremony.

All military personnel assigned to the Munitions Directorate are part of AFRL Detachment 6, therefore, the military officer in charge of the Munitions Directorate has two positions: director and also commander of Detachment 6.

A native of Lima, Ohio, Ruff is a Master Navigator with more than 1,800 flight hours in more than 15 types of aircraft, primarily the F-15 and F-4. He comes to Eglin from the Pentagon, where he was Deputy Director, Chief of Staff of the Air Force Operations Group, Headquarters Air Force. In addition, he has served as an instructor in test and operational tours in the F-4 and F-15E, which included combat missions in support of Operations Provide Comfort and Deny Flight. He also served as a wing executive officer, software integrated product team leader, deputy director in the F-15 program office and division chief on the Air Staff. @



Maj. Gen. Paul D. Nielsen (left), Air Force Research Laboratory commander, presided over the Detachment 6 change of command ceremony August 1 as Col. Michael C. Ruff (right), Munitions Directorate, took command.

# AFRL commander to receive AIAA Award

by Jill Bohn, AFRL Public Affairs

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — Air Force Research Laboratory Commander Maj. Gen. Paul D. Nielsen has been selected to receive a national award honoring significant achievement in aerospace technical expertise.

The American Institute of Aeronautics and Astronautics has announced that Nielsen will be the recipient of this year's "Hap" Arnold Award for Excellence in Aeronautical Program Management. AIAA is the principal society of aerospace engineers and scientists.

The coveted award is presented to individuals for outstanding contributions in the management of a significant aeronautical or aeronautical related program or project. The Hap Arnold award is named after Henry H. "Hap" Arnold, commanding general of the Army Air Force during World War II and later the first general of the Air Force.

In the citation of the award, Nielsen is recognized for "outstanding contributions to the restructuring of the Milstar satellite program, for an exemplary role as Director of Plans for NORAD, and for visionary leader-

ship of the Air Force Research Laboratory in these demanding times." As an award recipient, Nielsen will receive an engraved bronze medal, certificate of citation signed by the AIAA President and Chairperson of the Honors and Awards Committee, and a rosette pin symbolizing technical excellence.

The award will be presented at an awards luncheon Oct. 1, held in conjunction with the AIAA Aircraft Technology, Integration and Operations Forum, in Los Angeles, Calif.

Born in New Orleans, La., Nielsen directs the Air Force's \$1.6 billion science and technology budget, plus an additional \$1.1 billion from the laboratory's customers. Approximately 5,200 people execute the science and technology program in the laboratory's nine technology directorates and

the Air Force Office of Scientific Research.

AFRL's mission is leading the discovery, development and integration of affordable war-fighting technologies for Air and Space Force. The laboratory, headquartered at Wright-Patterson Air Force Base, Ohio, was created in October 1997.

The laboratory and its predecessors have overseen more than 80 years of critical re-

search efforts for the Air Force and DoD. Its technology breakthroughs can be found in all of today's modern aircraft and weapons systems, including the F-117 stealth fighter, B-2 bomber, C-17 airlifter and the F-22 fighter.

A distinguished graduate of the U.S. Air Force Academy, Nielsen entered the Air Force in 1972. Nielsen earned a master's degree in applied science from the University of California, Davis, and a master's degree in business administration from the University of New Mexico.

He earned a doctorate degree in plasma physics from the University of California, Davis.

He also attended National War College at Fort Lesley J. McNair, Washington, D.C., in 1989.

"The accomplishments of Gen. Nielsen demonstrate that he has been an outstanding Program Manager, with a record of demonstrated success in managing programs of increasing scope and importance," said Sivaram P. Gogineni, Ph.D., Membership Chair of the AIAA Dayton-Cincinnati Section, who nominated Nielsen for the award. "His efforts with the Milstar Program, NORAD and the Air Force Research Laboratory, alone, justify his receipt of the award."

Nielsen has held various positions at the headquarters level and in the field. He has served at three product centers and three



Maj. Gen.  
Paul D. Nielsen

---



---

# Net Index

---



---

Due to the number of submissions we receive, some sections of *news@afrl* are available exclusively on-line. The on-line version of the newsletter allows users to view the AFRL corporate calendar, news releases generated by AFRL headquarters, operating instructions, L@b L@urels and Roundups sections.

The L@b L@urels section of the electronic newsletter is dedicated to members of Air Force Research Laboratory who receive awards and honors. The Roundups section of the electronic newsletter keeps Air Force Research laboratory employees informed about contracts AFRL has awarded. Below is an index of articles one can find in each of these on-line sections.

---

## Fellows (from page 1)

**Hill** is renowned for work in computational electromagnetics (CEM). Her research has revolutionized radar cross-section modeling for America's stealth technology, and her CEM design tools are directly influencing future low observable weapon systems that provide our combat forces with a significant military advantage.

**McManamon** is a leader in electro-optical systems and is being recognized for his work in optical phased arrays and laser flash imaging. He is currently developing multidiscipline electro-optical sensors, including multifunction laser radar technology, needed to detect, track and identify difficult targets. His work also addresses novel electro-optic countermeasure systems and optical phased-array beam steering technology.

**Peterkin's** research in computational plasma physics for states of geometric complexity has significantly advanced the development of high power microwave systems. Additionally, he serves as Chief Scientist for the Department of Defense High Performance Computing Modernization Program.

"Every year, I look forward to announcing our newest Fellows," said Nielsen. "This is our highest award, and it gives us a great opportunity to recognize their leadership, imagination and foresight that keeps our Air Force great."

The selection committee considers both military and civilian scientists and engineers. To be eligible, participants must be assigned to AFRL for the last three consecutive years and have at least seven years of active federal service. The work being recognized must have been performed at the laboratory and meet the following criteria:

- ◆ Discovery of a factor, theory, etc., of important fundamental or sufficient magnitude to warrant recognition in the scientific or engineering community as a pioneering breakthrough;
- ◆ Recognition as a national or international authority in one or more fields, including widespread recognition within the Air Force;
- ◆ Sustaining of high-level achievements in programs of extraordinary importance to AFRL, the Air Force, or national defense;
- ◆ Continuing significant personal contributions to the lab beyond normal expectations; and
- ◆ Obtaining an exceptional record of scientific and technical achievements, creativity and leadership, patents, publishing in referenced publications, organizational skills, and development of lab programs.

The AFRL Fellows program is designed to recognize and reward the laboratory's most outstanding in-house scientists and engineers for their accomplishments and technical excellence. Each Fellow receives a special \$100,000 grant for the first two years following selection. The grant serves to assist in further self-development and additional research. This year's Fellows will be honored at a banquet at the United States Air Force Museum on Sept. 26. @

## AIAA award (from page 5)

laboratories, including assignments at the Secretary of the Air Force Office of Special Projects and the Department of Energy's Lawrence Livermore National Laboratory.

His previous job assignment was as the vice commander of the Aeronautical Systems Center (ASC). ASC is the Air Force's largest product center, responsible for developing fighters, bombers, transports, reconnaissance aircraft, training systems and unmanned aerospace vehicles.

With more than 31,000 members, AIAA is the world's largest professional society devoted to the progress of engineering and science in aviation, space and defense. @

## Improve (from page 3)

These criteria included the resolution of images taken by the panel, the size of the viewing area, pixel pitch, and imaging of real aircraft parts. The Varian 4030 amorphous silicon flat panel detector emerged as the detector of choice.

AXI developed the software package, which enables a technician to communicate with the detector panel, to capture a raw image, and to transfer the image to the data processing and viewing station. When the image has been transferred, a technician can retrieve the raw image, and process and analyze the data. Data filters and processing routines, which digitally enhance the image, can be applied to yield the best possible results.

The successful demonstration of digital radiography technology is a cost- and time-saving milestone, which aids the transition of this technology in the Advanced Technology Demonstration Digital Radiography Insertion Program.

The program focuses on specific Air Force depot applications to improve depot inspection capabilities. @

To view the full text of these and other articles visit the *news@afrl* page on the Internet at <http://extra.afrl.af.mil/news/index.htm>.

To submit L@b L@urels or Roundups from your directorate, send a query to AFRL Public Affairs at:

**Jill.Bohn@afrl.af.mil**  
or, **Anne.Gunter@afrl.af.mil**